

APPENDIX 6A. DETAILED DATA FOR EQUIPMENT PRICE MARKUPS

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APPENDIX 6A. DETAILED DATA FOR EQUIPMENT PRICE MARKUPS

6A.1 INTRODUCTION

This appendix provides further details on information presented in the Markups analysis (preliminary TSD chapter 6.)

6A.2 DETAILED DISTRIBUTOR COST DATA

Based on data provided in the *2008 Profit Report (2007 Data)* of the Heating Air-conditioning & Refrigeration Distributors International (HARDI), Table 6.4.1 of Chapter 6, section 6.3, *Estimation of Distributor Mark-ups* shows wholesaler revenues and costs in aggregated form. Table 6A.2.1 below provides the complete breakdown of costs and expenses as provided in the *2008 Profit Report (2007 Data) for controls and refrigeration distributors*. The column labeled “Scaling” in Table 6A.2.1 indicates which expenses the U.S. Department of Energy (DOE) assumed to scale with only the baseline markup and which it scaled with both the baseline and incremental markups. As described in Chapter 6, section 6.3, only those expenses that scale with baseline and incremental costs are marked-up when there is an incremental change in equipment costs.

Table 6A.2.1 Disaggregated Costs and Expenses for Controls and Refrigeration Distributors.

Item	Percent of Revenue	Scaling
Cost of Goods Sold	68.8.0%	
Gross Margin	31.2%	
Payroll Expenses	19.5%	Baseline
Executive Salaries & Bonuses	3.39%	
Branch Manager Salaries and Commissions	2.4%	
Sales Executive Salaries & Commissions	0.3%	
Outside Sales Salaries & Commissions	2.4%	
Inside/Counter Sales/Wages	3.8%	
Purchasing Salaries/Wages	0.5%	
Credit Salaries/Wages	0.2%	
IT Salaries/Wages	0.2%	
Warehouse Salaries/Wages	1.1%	
Delivery Salaries/Wages	0.2%	
All Other Salaries/Wages & Bonuses	1.3%	
Payroll Taxes	1.3%	
Group Insurance	1.5%	
Benefit Plans	1.0%	
Occupancy Expenses	3.6%	Baseline
Utilities: Heat, Light, Power, Water	0.4%	
Telephone	0.4%	
Building Repairs & Maintenance	0.3%	
Rent or Ownership in Real Estate	2.5%	
Other Operating Expenses	4.8%	Baseline & Incremental
Advertising & Promotion	0.4%	
Insurance (business liability & casualty)	0.2%	
Depreciation	0.3%	
Vehicle Expenses	0.9%	
Personal Property Taxes/Licenses	0.2%	
Bad Debt Losses	0.2%	
All Other Operating Expenses	2.6%	
Total Operating Expenses	27.9%	
Operating Profit	3.3%	Baseline & Incremental
Other Income	0.6%	
Interest Expense	0.8%	
Other Non-operating Expenses	0.0%	
Profit Before Taxes	3.1%	

Source: Heating, Air-conditioning & Refrigeration Distributors International. 2008. 2008 Profit Report (2007 Data).

Note: The distributor costs and expenses are percentage values as opposed to the per-dollar of sales revenue values shown in Table 6.4.1.

6A.3 DETAILED MECHANICAL CONTRACTOR DATA

Based on data in the 2005 edition of *Financial Analysis for the HVACR Contracting Industry*, published by the Air Conditioning Contractors of America (ACCA), Tables 6.5.1, 6.5.2, and 6.5.3 of Chapter 6, section 6.5, *Estimation of Mechanical Contractor Markups* provide mechanical contractor revenues and costs in aggregated form by ‘Cost of Goods Sold’ and ‘Gross Margin.’ The *Financial Analysis* report did not provide a more disaggregate tabulation of these costs and expenses. As in section 0, the gross margin category was assumed to scale only with the baseline markup.

The more disaggregated breakdown of costs used to scale the incremental markup are shown in Table 6A.3.1 by both dollar value and percentage terms from the 2002 Census of Business. As the ACCA data were used to calculate the baseline markup, only the categories in the ‘Scaling’ column that scaled with both the baseline and incremental markups are marked.

Table 6A.3.1 Mechanical Contractor Expenses and Markups Used To Scale the Incremental Markups

Item	Dollar Value	Percentage	Scaling
Total Cost of Equipment Sales	\$77,482,735	66.01%	
Cost of materials, components, and supplies	\$37,813,136	32.21%	
Payroll, construction workers	\$25,619,932	21.83%	
Cost of construction work subcontracted out to others	\$12,462,622	10.62%	
Cost of selected power, fuels, and lubricants	\$1,587,045	1.35%	
Gross Margin	\$39,898,412	33.99%	
Payroll Expenses	\$19,648,990	16.74%	
Fringe benefits, all employees	\$9,326,660	7.95%	
Payroll, other employees	\$10,322,330	8.79%	
Occupancy Expenses			
Rental cost for machinery, equipment, and buildings + Purchased communication services	\$2,926,539	2.49%	
Other Operating Expenses	\$2,969,716	2.53%	Baseline & Incremental
Depreciation charges during year	\$1,666,352	1.42%	
Cost of repairs to buildings and other structures + Cost of repairs to machinery and equipment	\$1,303,364	1.11%	
Net Profit Before Income Taxes	\$14,353,167	12.23%	Baseline & Incremental

Source: U.S. Census Bureau. 2002. Plumbing, Heating, and Air-Conditioning Contractors: 2002. Report EC02-231-238220, Table 4. Detailed Statistics for Establishments: 2002.

Note: Mechanical contractor costs and expenses are first presented as *total dollar* values and then converted to *percentage* values. This is in contrast to the *per dollar of sales revenue* values shown in Table 6.5.4.

6A.4 ESTIMATION OF DISTRIBUTOR AND CONTRACTOR MARK-UP STANDARD DEVIATIONS

DOE used U.S. Census survey data to estimate WICF equipment distributor, and mechanical contractor markup distributions. In the case of distributors, survey data were available only in summary form at the national level (Table 6A.4.1). In the case of mechanical contractors, the survey data include state-level heating, ventilating, and air-conditioning (HVAC) total value of work, number of firms, cost of goods sold, cost of subcontract work, cost of materials, and construction payroll as shown in Table 6A.4.2,

DOE estimated the size of the baseline markup distribution from national statistics and the standard deviation of across-state markups. DOE defined the relative standard deviation as the standard deviation as a percent of the baseline markup. The distributor markup standard deviation is 5.7 percent, derived from the average markup and published relative markup of 7.7 percent, as shown in Table 6A.4.1. The mechanical contractor markup standard deviation is 5.6 percent and the relative markup is 3.7 percent, derived from the average of state-level markups and their standard deviation in Table 6A.4.2.

DOE assumed that new construction and replacement market mechanical contractor markups have the same relative standard deviation as that developed from the baseline markups for all contractors. The fact that the mechanical contractor relative standard deviation is 3.7 percent of the baseline markup implies that the standard deviation for the replacement and new markets, relative to their respective baseline markups, is also 3.7 percent.

DOE also assumed that distributor and mechanical contractor incremental markups have the same relative standard deviation as distributor and mechanical contractor baseline markups. It used this assumption to calculate the standard deviation of distributor and mechanical contractor incremental markups.

The relative standard deviations for mechanical contractors are not used directly to estimate markups as for wholesale trade. The markups in construction vary systematically relative to their mean by state, so the state relative markups are applied individually to average markups by class of construction in each state.

Table 6A.4.1 Distributor Incremental Markup Standard Deviation

Number of Firms	Sales (\$000)	Cost of Goods Sold (\$000)	Gross Margin (\$000)
5180	\$17,715,524 Cv for 4237 = 1.6%	\$12,789,493	\$4,627,533 Cv for 4237 = 7.7%
Since $Cv = \sigma / \mu$, $\sigma = Cv / \mu = 0.077 / 1.362 = 0.057$ Where: Cv = Coefficient of variation σ = Standard deviation μ = mean value			

Sources: U.S. Census Bureau. 2005. Sector 42: Wholesale Trade: Subject Series - Misc Subjects: Gross Margin and its Components for Merchant Wholesalers for the United States: 2002 @ http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-_skip=0&-ds_name=EC0242SXSBO6&-_lang=en

U.S. Census Bureau. 2005. Annual Report for Wholesale Trade: 2002-2003. Report BW(MSBO)/04-A.
<http://www.census.gov/svsd/www/msbo2003.pdf>

U.S. Bureau of Census. 2005. Table 4. Estimated Coefficients of Variation of Annual Sales, End-of-Year Inventories, Purchases, Gross Margins, and Gross Margin/Sales Ratios for Merchant Wholesalers, excluding Manufacturers' Sales Branches and Offices (MSBOs) @ <http://www.census.gov/svsd/www/atstable4.txt>

Notes: The data are at the national level.

NAICS 4237 applies to Hrdwr, plumb & heat equip & supp merchant wholesalers and 42373 applies to Warm air heating & AC equip merchant wholesalers.

Cv = coefficient of variation.

Table 6A.4.2 Mechanical Contractor Baseline Mark-ups by State, 2002

State	Number of Firms	Value of Construction (\$000)	Cost of Subcontract Work (\$000)	Cost of Materials (\$000)	Construction Payroll (\$000)	Baseline Markup	Relative Markup
Alabama	1,425	1,490,919	151,240	547,075	308,967	1.480	0.981
Alaska	229	384,009	68,230	110,136	73,456	1.525	1.010
Arizona	1,510	1,958,430	141,885	776,733	420,945	1.462	0.969
Arkansas	1,045	799,157	65,491	305,198	154,099	1.523	1.009
California	7,272	12,346,970	1,172,183	4,018,408	2,701,227	1.565	1.037
Colorado	2,015	2,354,183	235,012	821,432	547,419	1.468	0.973
Connecticut	1,321	1,580,361	156,607	505,340	320,528	1.609	1.066
Delaware	306	460,330	42,001	150,096	112,360	1.512	1.002
District of Columbia	22	117,971	D	29,263	21,379	1.490	0.987
Florida	5,069	6,255,428	616,097	2,270,555	1,263,030	1.507	0.999
Georgia	2,534	3,436,673	380,819	1,226,368	653,972	1.520	1.007
Hawaii	280	358,921	36,053	129,870	65,305	1.552	1.029
Idaho	594	546,349	47,466	211,341	133,160	1.394	0.924
Illinois	3,848	6,112,025	605,868	1,770,254	1,504,166	1.575	1.044
Indiana	1,867	2,964,787	418,904	869,816	753,388	1.452	0.962
Iowa	1,066	1,189,684	133,934	428,842	265,529	1.436	0.952
Kansas	966	1,225,986	155,011	431,331	264,876	1.440	0.954
Kentucky	1,219	1,357,063	121,960	469,639	307,205	1.510	1.000
Louisiana	1,469	1,439,726	174,283	497,169	291,819	1.495	0.990
Maine	458	393,322	36,149	138,587	76,034	1.568	1.039
Maryland	2,024	3,902,613	583,237	1,251,986	797,428	1.482	0.982
Massachusetts	2,520	3,531,662	503,155	1,038,151	713,798	1.566	1.038
Michigan	3,051	4,334,221	492,957	1,338,229	957,980	1.554	1.030
Minnesota	1,635	2,860,054	280,556	958,849	599,935	1.555	1.030
Mississippi	655	754,652	70,985	283,993	132,824	1.547	1.025
Missouri	1,816	2,538,706	276,621	849,770	581,090	1.487	0.985
Montana	432	356,269	44,987	135,009	68,332	1.435	0.951
Nebraska	683	819,918	90,582	321,124	177,052	1.393	0.923
Nevada	498	1,093,329	78,259	350,851	236,089	1.644	1.089
New Hampshire	531	535,046	52,209	179,259	123,215	1.509	1.000
New Jersey	3,551	4,210,275	466,668	1,230,617	949,465	1.591	1.054
New Mexico	599	543,713	51,116	191,757	104,423	1.566	1.037
New York	5,750	7,561,952	949,038	2,335,220	1,595,864	1.550	1.027
North Carolina	2,978	3,231,394	339,388	1,127,518	684,958	1.502	0.995
North Dakota	272	291,850	34,971	105,405	66,002	1.414	0.937
Ohio	3,514	4,611,590	502,061	1,470,907	1,037,116	1.532	1.015
Oklahoma	1,158	906,621	77,207	341,921	185,111	1.500	0.994
Oregon	1,031	1,440,390	132,523	506,559	332,135	1.483	0.983
Pennsylvania	3,653	5,929,629	639,074	1,766,004	1,193,465	1.648	1.092
Rhode Island	397	490,872	60,217	171,994	99,426	1.480	0.981

South Carolina	1,472	1,395,359	111,394	518,386	327,238	1.458	0.966
South Dakota	337	333,758	22,754	141,297	58,708	1.498	0.993
Tennessee	1,370	2,292,875	201,748	846,426	459,475	1.521	1.008
Texas	5,653	8,061,607	807,501	2,889,320	1,746,739	1.481	0.981
Utah	892	1,010,317	113,775	353,958	202,682	1.507	0.999
Vermont	282	208,056	19,987	77,251	43,158	1.482	0.982
Virginia	2,547	3,036,417	254,085	1,074,309	700,273	1.497	0.992
Washington	1,602	2,344,257	222,282	773,211	543,668	1.523	1.009
West Virginia	416	296,407	19,109	99,089	71,401	1.563	1.036
Wisconsin	1,839	2,578,014	193,399	941,806	617,852	1.471	0.974
Wyoming	262	166,318	D	59,507	35,307	1.451	0.962
Average Baseline Markup Standard Deviation Relative Standard Deviation						1.509	1.000
						0.056	
						0.037	

Sources: U.S. Bureau of the Census. American Factfinder. 2002 Economic Census. Sector 23: Construction: Geographic Area Series: General Statistics for Establishments by State: 2002. Accessed on March 25, 2009 at

http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0200A1&-industry=23822&-NAICS2002sector=8699097&-ib_type=NAICS2002&-lang=en&-geo_id=&-NAICS2002=23822&-ds_name=EC0223A1&-NAICS2002subsector=8701562 and

Bureau of the Census. American Factfinder. 2002 Economic Census. Sector 23: Construction: Industry Series: General Statistics for Establishments by State: 2002. Accessed March 25, 2009 at http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0200A1&-industry=238220&-NAICS2002sector=8699097&-ib_type=NAICS2002&-lang=en&-geo_id=&-NAICS2002=238220&-ds_name=EC0223I03&-NAICS2002subsector=8701562

Notes: The Census Bureau withheld data for some states.

Markups may vary across states for several reasons, including differences in firm size.